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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/624,808

07/22/2003

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EXAMINER

DOAN, DUC T

ART UNIT

PAPER NUMBER

2188

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/624,808	Applicant(s) BAILEY ET AL.	
	Examiner DUC T. DOAN	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9 and 23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

Claims 1-24 have been presented for examination in this application.

Claims 1-8, 10-22, 24 have been canceled.

Claims 9 and 23 remain pending.

Claim 9 and 23 are rejected.

Applicant's remarks filed 12/26/2007 have been fully considered with results as follows,

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Day et al (US Pub 2003/0084030) in view of Tarui et al (US Pub 2002/0112102) and further in view of Kaneko (US Pub 2003/0163641).

As in claim 9, Day discloses a computer-implemented method for reconfiguring an identified I/O Input/Output (I/O) resource in a computer system that includes a plurality of logical partitions managed by a partition manager executing separately from the plurality of logical partitions (Day's Fig 2, 206B 205B hypervisor partitions, 203 203 hypervisor management code and low-level based hyper visor code PLIC, paragraph 37; The partition manager can dynamically reconfiguring resources among logical partitions, see paragraphs 7 and 41 and 26; Examiner note: the identified I/O input/output resource can be viewed as an I/O resource being identified for changing/reassigning per Applicant's remarks filed 12/26/2007), the plurality of logical partitions comprising at least one logical partition that owns the identified I/O resource and at least one logical partition that does not own the identified I/O resource (Reassign an identified resource dynamically in a pool comprises of moving the identified resource from current logical partitions (partitions that currently accesses/owns the identified resource) to other logical partitions (partitions that currently do not access/do not owns the identified resource), see paragraphs 41 and 44), the method comprising the steps of:

(1) the partition manager detecting a hardware state in the computer system that requires reconfiguration of the identified I/O resources (The hypervisor comprises state data to enforcing the configuration/allocation of resources to partitions, paragraph 37);

Day does not expressly disclose the details associating with the remaining claimed steps. However, Tarui discloses,

(2) the partition manager suspending the at least one of logical partitions by inhibiting dispatching of tasks to the at least one of logical partition (Tarui's paragraph 84, the partition control program instructs the OS of the current partition to stop using the identified resource, By

stopping the I/O tasks of the current partition, the identified resource, I/O adapter, is allowed to be disconnected from the current partition) and waiting until all pending tasks in the at least one of logical partitions are complete (Tarui's Fig 1 101, pending tasks in logical partition are flushed by the I/O adapter circuitry until it completed, when no more pending I/O requests and byte counter value is zero, see paragraphs 65,67 and 84);

(3) the partition manager reconfiguring the identified I/O resource (the identifier I/O resource is reconfigured to another partition, paragraph 84);

(4) the partition manager resuming one of the plurality of logical partitions by enable dispatching of tasks to all of the plurality of logical partitions (Tarui's paragraphs 83 and 84, after reconfiguring the identified I/O resources, naturally the system is resumed and tasks are distributed to appropriate logical partitions);

It would have been obvious to one of ordinary skill in the art at the time of invention to include the partition control program and associating logic as suggested by Tarui in Day's system thereby the reconfiguration I/O resource can be done dynamically in an efficient manner (Tarui's paragraph 84).

Day and Tarui do not expressly disclose the claim's aspect of suspending/resuming **all** of the plurality of the logical partitions. However, Kaneko's paragraph 31 discloses a storage subsystem with I/O resources being logically partitioned and assigned to different users. Kaneko further discloses an I/O reconfiguration mechanism including **all** of the logical partitions being suspended, the I/O reconfiguration reconfigures the identified I/O resource by inhibiting dispatch of tasks to **all** of the plurality of logical partitions (Kaneko's paragraph 32, the whole system is switched to a disconnect standby mode), and waiting until **all** pending tasks in all of the plurality

of logical partitions are completed (Kaneko's paragraph 32 lines 13-14, when the requests from the host have been completed processed), and resumes **all** of the plurality of logical partitions by enable dispatching of tasks to **all** of the plurality of logical partition (Kaneko's paragraph 33, when there is no more requests from the host, the logical partitioning/configuring/changing is carried out, and when this step is completed, the system resume to executing all suspended requests and other new dispatching requests). Kaneko's paragraph 24 further teaches the logical partitioning of resources can be done in a dynamically manner. It would have been obvious to one skill of the art at the time of invention to include the logical partitioning mechanism as suggested by Kaneko into Day's system modified by Tarui, thereby the reconfiguration of i/o resources can be done easily in a dynamically manner (Kaneko's paragraph 24).

As in claim 23, Day discloses a computer-implemented method for rebalancing input/output (I/O) loop (a pool of resources) in a computer system that includes a plurality of logical partitions managed by a partition manager executing separately from the plurality of logical partitions (Day's Fig 2, 206B 205B hypervisor partitions, 203 203 hypervisor management code and low-level based hyper visor code PLIC, paragraph 37; The partition manager can dynamically reconfiguring resources among logical partitions, see paragraphs 7 and 41 and 26; Day further teaches rebalancing a pool of resources among logical partitions, paragraphs 44,47 and 48), the method comprising the steps of:

(1) detecting when the I/O loop is unbalanced (Day's paragraph 47, proper allocation of resource requires detecting when unbalancing happens);

Day does not expressly disclose the details associating with the remaining claimed steps. However, Tarui discloses,

(2) quiescent I/O resources in the I/O loop (Tarui's paragraph 84, partition program instructs the OS of the current partition to stop using the I/O resource, so that the I/O resource can be quiescent/disconnected);

(3) determining which of the plurality of logical partitions own the I/O resources in the I/O loop (Tarui's paragraph 84, the current partition (owner of the I/O resource) is determined and instructing the current partition to stop using the I/O resource);

(4) suspending the logical partitions determined in step (3) (Tarui's paragraph 84, the current partition is prohibit from further using the I/O resource);

(5) rebalancing the I/O loop by allocating at least one I/O resource in the I/O loop from a first logical partition to a second logical partition (Tarui's paragraph 84, switching the I/O resource from current partition to another partition);

(6) enabling the I/O resources in the I/O loop after rebalancing in step (5) (Tarui's paragraph 84, enabling the I/O resource for the partition); and

(7) resuming the logical partitions suspended in step (4) (Tarui's paragraph 84, the system is resumed).

It would have been obvious to one of ordinary skill in the art at the time of invention to include the partition control program and associating logic as suggested by Tarui in Day's system thereby the reconfiguration I/O resource can be done dynamically in an efficient manner (Tarui's paragraph 84).

Regarding the claim's aspect of an Input/Output **loop**. Day teaches the concept of balancing of resources, by putting resources into a pool, and resources in the pool can be divided to plurality of partitions in allocation units in a balancing manner (Day's paragraphs 44, 47 and

48). Day further discloses the resources can be any resources in the system (processors, I/O resources, paragraph 37). Day and Tarui do not explicitly mention the claimed "the Input/Output **loop**". However Kaneko discloses a storage subsystem with I/O resources that are arranged including I/O physical resources (Kaneko Fig 2, 11, 12,13, and 14) and wherein the physical I/O resources (Fig 2, 211 to 214, 221 to 224, 231 to 234 etc array of disks and including Fig 2 11 to 14) are organized into I/O loops (Examiner note: the I/O loop can be interpreted as a group of I/O resources, and the I/O resources in the group/loop can be assigned and make available to different users/partitions (Kaneko's paragraph 31). It would have been obvious to one skill of the art at the time of invention to include the organizing the physical I/O resources into group/loop of I/O resources as taught by Kaneko into Day's system modified by Tarui, and thereby the physical I/O resources in the group/loop can be assigned to different users can be done easily in a dynamically manner (Kaneko's paragraph 24).

Response to Arguments

Applicant's arguments in response to the last office action has been fully considered but they are not persuasive. Examiner respectfully traverses Applicant's arguments for the following reasons:

A) With regarding to Applicant's arguments for the rejection of claim 9, Applicant argues "Because each logical partition in Kaneko can access the shared resources in all the other logical partitions, Kaneko must stop all the logical partitions. However, stopping all the logical partitions in Kaneko only reads on stopping logical partitions that own I/O resources. Nowhere

do any Day, Tarui or Kaneko teach or suggest suspending all logical partition, where some of the logical partitions do not own the identified I/O resource..”. Examiner disagrees.

Applicant appears to mischaracterize the partitions sharing of I/O resources with partition that own the identifier resource. The partition that owns the identifier I/O resources is **the current partition** that is **currently accessing** the I/O resource being identified for reconfiguration or being identified for reassigning to another partition. And the partition, not currently accessing the identified I/O resource is the partition not own the identified I/O resource (for example the disks being reassigned). Furthermore, data associated to these logical partitions can be stored in a shared storage medium and/or non storage medium (memories or disks storing data associating with reassigning).

In other words, the sharing of I/O resource by plurality of partition has nothing to do and in no way prevent one partition as being the role of the current owner of the I/O resource and the other partition as being the role of not being the current owner of the I/O resource at the same moment. Therefore, Kaneko teaching of reassign/reconfiguring of an identified I/O resource, for example from a current partition (currently access/own the resource) to another partition (not current access/not own the resource) wherein all of these partitions must stop, met the limitations as claimed (“...suspending all of the plurality of logical partitions..” and in the preamble “the plurality of logical partitions comprising at least one logical partition that owns the identified I/O resource and at least one logical partition that does not own the identified I/O resource..”).

Therefore, Applicant’s argument is not persuasive.

B) With regard to Applicant's arguments for the rejection of claim 23, Applicant argues that Kaneko does not teach the concept of I/O loop and "...no where do ANY of the cited references have anything to do with rebalancing an I/O loop. Examiner disagrees.

Day clearly discloses the concept of balancing of resources, by putting resources into a pool, and resources in the pool can be divided to plurality of partitions in allocation units in a balancing manner (Day's paragraphs 44,47 and 48). Day further discloses the resources can be any resources in the system (processor, I/O resources, paragraph 37). Day and Tarui do not explicitly recite the "the Input/Output **loop**". However Kaneko discloses a storage subsystem with I/O resources that are arranged including I/O physical resources (Kaneko Fig 2, 11, 12,13, and 14) and wherein these physical I/O resources (Fig 2, 211 to 214, 221 to 224, 231 to 234 etc array of disks) and including Fig 2 11 to 14 are organized into I/O loops (Examiner note: the I/O loop can be interpreted as a group of I/O resources, and the I/O resources in the group/loop can be assigned and make available to different users/partitions (Kaneko's paragraph 31).

Therefore, Applicant's argument is not persuasive.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 36 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

When responding to the office action, Applicant is advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The examiner can normally be reached on M-F 8:00 AM 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung S. Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Hyung S SOUGH/

Supervisory Patent Examiner, Art Unit 2188

05/07/08